explorations, &c., I fear this flattering description must have arisen from the writer not having a practical acquaintance with local societies.

In a society in the West of England, consisting of nearly 400 members, I know of but one who does anything for the local museum, or for the advancement of geological science. The society's principal results are archæological; geology and natural history are in the background. Another west country society is divided into innumerable sections, which have their excursions, and an occasional general excursion; but their results in the cause of science are as valuable as those of an ordinary picnic party. This description will, I fear, answer also very well for one with which I am acquainted in Sussex. In all these instances the local museums are such as might be expected from such apathy.

In too many instances the science of the scientific societies begins and ends with the name. There may, perhaps, be one or two members who are active, but feel little encouragement to do much for the public good, or in the way of contributing to the local museum. Of course these societies are composed in a great measure of members who take no interest whatever in science, and who join them without any definite object; but it is a pity that the public should be subjected to such a delusion. There are, of course, some few societies which are fortunately more active, and produce valuable results, but as yet I have seen no good local museum in connection with them, and that is a bad test of the practical nature of a society. I know of but one museum which at all answers the description of a local museum, and that is at Bath, which is due to the genius and energy of Mr. Charles Moore. But as long as members of local societies collect for themselves and, not for the public good, their museums must remain at a stand still. Few have any idea of the valuable collections which are made, or the labour spent on their formation, by individuals who are indifferent as to what eventually becomes of them.

It is want of public spirit and self-complacency, which are the great hindrances to all progress. It is to be regretted that the Geological Society of London does not set more of an example to the provincial societies; it ought to exert an influence throughout the country, and take some interest in their progress. The state of the collections at Somerset House is certainly not an honour to any society.

The co-operation of local societies, and having their results published for the benefit of all, *might* have a great effect on the advancement of science A general contribution for the purpose of a weekly issue of British Journals of Science (in various departments), which should be common to all, would be a step of great importance. I know of no remedy for this state of ignorance and apathy as to the valuable results of which they might be capable, but such a co-operation, combined with a certain amount of union with the scientific societies of London, which might have the effect of keeping the provincial societies up to the mark. This must also be accompanied by a unity of object, as well as of system in the management and arrangement of their museums.

F. G. S.

Newspaper Science

In reply to the letter of "Medicus" in last week's Nature, allow me again to state that the curious details as to Krupp's gun manufactory, with which the public were enlightened in the *Globe* of September 11, appeared in that paper as a leading article, and not as a mere "note-paragraph," as "Medicus," who "never writes articles," evidently desires to be understood. Had they been in the form of the ordinary newspaper paragraph, containing accounts of some wonderful discovery in zoology, chemistry, or mineralogy, such as, for example, some late ones on "the appearance of a gigantic lizard in North Wales," "the extraction of the fixed air from the pea sausage for use in the army," or the "abundance of platinum at Bathgate, in Scotland,' which I find copied into the *Times* of to-day, I should not have troubled the readers of Nature with my letter of September 13.

When, however, we find such "blunders," to use "Medicus's" own word, whilst he admits at the same time that they "had passed the editorial eye," palmed on the public on the authority which should be due to the leading article of a highly respectable and largely circulated newspaper, I think it is high time to protest against technical science being popularised in this style; and *à propos* to style, the peculiarly pleasant and what would vulgarly but expressively be called the "chaffing" style of "Medicus's" communication to Nature conveys to the reader the impression that its author is more at home in writing for penny newspapers than for scientific periodicals.

In conclusion, the perusal of the letter of "Medicus" will certainly remind metallurgists of the man who, when he felt his feet slipping under him in the water, brought himself altogether out of his depth by imprudent and convulsive struggles to extricate himself. The use of the French word "*creuset*" instead of the plain English "crucible," suggests a French source of information, and not the original German "Schmelztiegel" of Krupp's manufactory at Essen; and when "Medicus" corrects his text, and tells us it should read "the iron is alloyed in crucibles formed with certain clays and a preparation of plumbago" (!) metallurgists will still believe that it was steel not iron which is introduced into these crucibles, and doubt its being alloyed at all, but only melted in them; and will, moreover, be of opinion that if "Medicus" was at home in the subject on which he has been writing, he would have at once explained that when he unfortunately described the steam-hammer as "of the force of 25,000 kilometres" (in plain English, 15,532 miles), that the last word was simply a misprint for kilogrammes (so that the hammer was nearly $24\frac{3}{4}$ English tons), and not grasped at a straw in the shape of the far-fetched and in this instance equally misapplied term kilo*gram*metre!

David Forbes

11, York Place, Portman Square, London, Oct. 9

P.S.—If "Medicus" desires correct information as to the steam-hammers, &c., at Krupp's manufactory at Essen, he will find it in the recently-published official report of the Chamber of Commerce there, a short abstract of which is embodied in my fourth quarterly report (for 1871) to the Iron and Steel Institute, on the "Iron and Steel Industries in Foreign Countries."

The Cyclone in the West Indies

I think others besides me would be glad of an article in your paper on the Cyclone of the 21st of August in the West Indies. The narrow limits of the hurricane are noteworthy. I hear from the West Indies that Nevis, between Antigua and St. Kitts, has escaped, being a little to leeward. Has Saba escaped likewise? To windward Barbuda and Anguilla seem to have been also beyond the storm, as was also Virgin Gorda; the centre of the cyclone passing over St. Thomas (and, I presume, Tortola also) on its way to Porto Rico.

I have exact details only from St. Thomas, which I could, I think, put at the service of any one writing on the matter; but the principal fact in them is, that the main rush of wind, which did the damage, fell on the harbour from N.E. to N., destroying horribly all houses in the N.E. gully which slopes down to the harbour; but so turned right and left by the high hills above the town, that it was impossible for one in the harbour to discern the actual direction of the main current. This blast fell just before the central calm.

I trust that we shall have from some of your contributors somewhat which will throw more light on all hurricanes, from the lessons of this last.

Excuse the interest which one who knows those seas and islands—when he passed through them, blazing in beauty and repose—must needs take in the details of such a tragedy.

Eversley, Winchfield C. Kingsley

On the Solution of a certain Geometrical Problem

I regret that the work I referred to should have been so readily identifiable; still more, that Mr. Todhunter should think I intended to imply "signal geometrical weakness" on his part. I should imagine, on the contrary, that few living men surpass Mr. Todhunter in geometrical strength; though I may have inferred from some passages in his works that that special part of his mathematical strength had not been so fully developed by practice as his power in mathematical analysis.

It must be quite obvious to anyone who reads the whole of the appendix to Mr. Todhunter's Euclid, that sooner or later the series of problems on circle-contact (*i.e.* to Prop. 16) would require the introduction of the sixth-book method. This method is also very conveniently introduced in Prop. 7. But the omission of all mention of the third-book method* would certainly lead the student to infer that the sixth book must be employed. If it led me to infer that Mr. Todhunter happened not to know

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* Especially as but three lines would be needed to indicate the method. Thus: From the given point A draw a perpendicular A D to the bisector of the angle between the given lines; produce A D to E so that D E is equal to A D; a circle described (by the preceding proposition) through D and E to touch either of the given lines will obviously touch the other also.

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of the third-book method, I can readily show that such an inference was by no means so absurd as might be inferred from his remarks about the oldness of the problem. For I remember distinctly an occasion on which the solution of this problem was required during a lecture at King's College, London, at which my friends Baily (second wrangler in 1860) and Hudson (third wrangler in 1861) were present. Three of the students at once submitted to the lecturer the solution by the sixth-book method (which no one can well miss), and the lecturer (a second wrangler), while admitting that the solution was not very pleasing, was unable at the moment to suggest a better; he added, jokingly, that the best way to solve the problem would be to describe a parabola having the given point as focus and either of the given lines as directrix. Now, he had not been long engaged in teaching, and it may be perfectly true that one who had been so engaged "would certainly have in his memory one or more solutions of this problem;" but this would depend on the subjects he had been engaged upon. If he chanced to be one of the most eminent mathematical professors at Cambridge, it is probable that no problem in the higher analysis would be unknown to him, but the odds would be rather against than in favour of his being familiar with the best solutions of geometrical problems, just as the odds would be against his being proficient in the rules for "Barter," "Tare and Trett," and "Alligation Partial."

From letters which have reached me I find that the general purport of my letter has been misapprehended, since some appear to infer that I question the geometrical power of our University mathematicians. I meant nothing so unreasonable. We have geometricians who rival (and I believe more than rival) in power the best Continental geometricians. But their geometrical strength has not been attained during their University career; and no one who considers carefully the mathematical course at either University, can believe that it tends either to form geometricians or to foster geometrical taste.

I candidly admit that I do not speak of either course from personal experience. All I know of geometry was learned before my Cambridge time, and very nearly all I know of analytical mathematics was learned after that time. But I know quite well the nature of each course, and can sustain my statement that our universities do not encourage the study of geometry. Whether they should do so is a matter on which I have expressed no opinion. RICHD. A. PROCTOR

Brighton, Oct. 7

P.S.—Mr. Todhunter refers to the actual solution of the problem as a "matter of some interest, though of course unconnected with the theoretical solution." As I have had some experience in constructive geometry (having always made it a practice to solve astronomical problems constructively before proceeding to numerical calculation), I may be permitted to make some remarks on this point. First I would add to the compasses and parallel ruler (the only instruments mentioned by Mr. Todhunter) that most useful instrument the square. With this instrument (which would be needed in any case) the following construction would be as convenient as the one founded on the sixth-book solution. The problem, be it remembered, requires that a circle should be described through a given point to touch two given straight lines. Let P be the point, AB and AFCG the lines, AHDK the bisector of BAC (this bisector must be drawn in both methods, so that I leave its construction untouched); with the square draw CPD square to AK, and PE square to CD; with centre D draw circular arc PE; with centre C and distance PE draw half circle FLG; then FH and GK drawn square to AG (with the square) are radii of the two circles fulfilling the conditions.

Prof. Newcomb and Mr. Stone

IN Mr. Proctor's letter to NATURE of the 23rd ult., he remarks that Prof. Newcomb had stated to him that he was bewildered at having a discussion of the transits of Venus and the parallax of the Sun, deducible from them, prior to that of Mr. Stone, attributed to himself; and Mr. Proctor goes on to state that he was justified in his belief that such a discussion had been made because a writer, signing himself "P. S." had asserted that it had in a letter appearing in the *Astronomical Register* for December 1868. He further gives two reasons for the unhesitating credit which he had given to the assertion of "P. S." The first of them is that there is strong internal evidence that the writer was a distinguished astronomer having those as his initials (or a part of his initials, it would be more correct to say); of this it seems scarcely needful to say more, as the writer in question may prefer not to be unearthed. But of Mr. Proctor's other reason, may I be permitted to say a word? It is that the assertion of "P. S." was "permitted to remain uncorrected."

Had Mr. Proctor turned to the very next number of the *Astronomical Register* (that for January 1869) he would have found a letter signed also with initials "W. T. L." in which "P. S.'s" assertion that Prof. Newcomb had published any discussion of the transit of Venus in 1769, is most emphatically contradicted. "P. S.," it is true, made a rejoinder in the March number of the *Register* (page 65) but in it he neither denies "W. T. L.'s" contradiction, nor refers (as of course he could not) to any original investigation of the transit-of-Venus problem by Prof. Newcomb. He contented himself with the rather unintelligible remark that "W. T. L.'s" answer was not in "the spirit of the age we live in." The latter writer in the following number of the *Register* (page 88) pointed how, in all probability, the mistake of "P. S." had arisen from misunderstanding part of the title of a paper by Prof. Newcomb on the Distance of the Sun, and the matter dropped.

Now, as Prof. Newcomb was as likely to have seen "W. T. L.'s" contradiction as "P. S.'s" assertion, there would certainly seem no necessity for his further disowning himself what "P. S." had claimed for him. W. T. LYNN

Blackheath, Oct. 2

Note on the Cycloid

I DO not know whether it has been noticed that the cycloid is a projection of the common helix (thread-inclined 45°). I suppose the property must have long since been recognised, but have not seen it mentioned.

The proof is very simple, and may be thus presented:—

Suppose a vertical circle to have its plane east and west (a luminous point, for the nonce), the sun in the meridian and 45° high. Then the shadow of the circle on a horizontal plane will clearly be a circle; and further, if a point move uniformly round the vertical circle, the shadow of the point will move uniformly round the shadow-circle. Now, let the centre of the vertical circle advance horizontally towards the south, while a point moves round its circumference at the same uniform rate. The moving point will describe a right helix with a thread-inclination of 45°. Its shadow will move uniformly round the shadow-circle while the centre of this circle advances uniformly and at the same rate in a straight line. It will therefore describe a cycloid.

It is obvious that all the varieties of curtate and prolate-cycloids may be obtained as projections of helices, by changing the thread-inclination.

Also it is obvious that if the sun (or the point of projection) were in the zenith, the shadow (or projection) of the helix first dealt with would be the curve called "the companion to the cycloid." RICHARD A. PROCTOR

Is Blue a Primary Colour?

IN recent works on colour blue is called a primary colour. If blue is a primary colour a mixture of yellow and blue transparent pigments could not produce green, but would form an opaque combination. The colour produced by a mixture of yellow and blue pigments—if blue is an elementary colour—will depend on the colour reflected by the coloured layer itself, and not on the light passed through it from the white surface underneath. The brilliancy of the green produced by mixing yellow and blue pigment, is a measure of the transparency, to the green rays, of the blue pigment employed. Or in other words, there is as much green in the blue pigment employed, as there is green in the green produced by mixing that pigment with yellow. Blue must, therefore, be a compound colour, since the blue pigment passes the green rays.

Further. When the light reflected from blue substances is examined with a prism, it is found to be composed of green and violet. Again, when green and violet are combined by means of a rotating disc, blue is produced. By varying the proportions of green and violet any colour from green through blue-green or sea-green, blue, blue violet or indigo to violet, may be obtained. Again, when the solar spectrum is thrown on a blue surface, the green and the violet rays are reflected in the same way as a yellow surface reflects the red and the green rays.

The following is a simple way of showing that blue is not an elementary colour, and that violet is an elementary colour:—Take a piece of red, a piece of green, and a piece of violet

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